

Application Serial No. 10/510,395
Docket No. 1093-109 PCT/US
Response to October 6, 2008
Non-Final Office Action

REMARKS

The Non-Final Office Action mailed October 6, 2008 and the references cited therein have been carefully considered and Applicants respectfully request reconsideration. Claims 1-19 are currently pending in this application. By this Response, Applicants have amended Claims 1-3, 7, 9, 11-13 and 19. The amendment to the claims are introduced herein solely to address the claim objections and non-prior art claim rejections in the subject Office Action, as address further below. Accordingly, no new matter is presented by these amendments. The amendments to the claims are not intended by the Applicants to change or limit the scope of the claims herein, particularly with regard to the prior art. Entry of these amendments is respectfully requested.

Also, Applicants have hereby amended the Specification to correct various typographical errors noted from the English language translation of the Specification. Accordingly, no new matter is presented by these amendments. Entry of these amendments is respectfully requested.

Applicants respond specifically below to the issues raised in the subject Office Action and respectfully request reconsideration thereof.

Allowable Subject Matter

Applicants appreciate and acknowledge the Examiner's indication of allowable subject matter recited in Claim 11. Applicant has maintained Claim 11 in dependent form at this time, in view of the remarks presented below with regard to the prior art rejections to the base claims.

Information Disclosure Statement

The subject Office Action noted that various references cited in the previously submitted Information Disclosure Statements could not be considered. Thus, Applicants hereby submit a further Information Disclosure Statement to correct the noted deficiencies. As copies of the cited documents were previously filed herein, Applicants have not filed further copies of those documents at this time. Accordingly, Applicants respectfully request consideration of the cited prior art references listed in the Information Disclosure Statement filed herewith.

Drawings

In the Office Action, the drawings have been objected to as needing descriptive labels other than numerical (labels), at least for Figures 1, 2, 6 and 8a-8b. As such labels are not typically required under 37 CFR §1.84(o), Applicants respectfully request further clarification from the Patent Examiner in this regard as it is unclear what types of labels are needed. It is unclear why the Examiner has expressed that because the figures “depict the actual physical for(m) of the security element” that labels should be required. It should be noted that a description of all drawing figures is included in both the ‘Brief Description of the Drawings’ section as well as more fully in the Specification. It should further be noted that none of the prior art references cited in the subject application include any such labels. Accordingly, Applicants respectfully request further clarification and/or withdrawal of the objection to the drawings.

Claim Objections

In the Office Action, Claim 1, 7, 9, 11-13, 17 and 19 are objected to for various informalities. Thus, Applicants by this amendment have amended the claims to conform with tradition U.S. practice. For example, a semicolon has been added after “comprising” in Claim 1, line 1 to denote the transitional phrase, as noted by the Examiner. Also in this regard, Applicants have attempted to add formatting, such as indents, in order to present the claims in a format which better indicates the various features of the claimed invention. Further, Applicants appreciate and acknowledge the typographical error of “subtractive” noted by the Examiner, which has now been amended to correct this error. The amendments to the claims are not intended by the Applicants to change or limit the scope of the claims herein, particularly with regard to the prior art. Accordingly, Applicant respectfully requests reconsideration and withdrawal of these objections.

Claim Rejections under 35 USC § 112

In the Office Action, Claims 1-19 have been rejected under 35 USC §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Office Action rejects the use of the phrases “portion-wise steady,” “local angle of inclination,” and “slowly” as being indefinite. Thus, Applicants by the amendments presented herein have eliminated the uses of these phrases. The amendments to the claims are not intended by the Applicants to change or limit the scope of the claims herein, particularly with regard to the prior art.

However, the Office Action also rejects the use of the phrase “optically effective structure” as not being adequately defined by the claim or the specification. Applicants respectfully traverse this portion of the rejection. The expression “optically effective structure” is in fact defined within the claims and more fully supported by the specification. For example, Claim 1 recites that “the optically effective structures are shaped into a reflecting interface in surface portions...at least one of the surface portions...comprises a diffraction structure...and a microscopically fine relief profile (R)”. The Claim goes on to further recited aspects of this diffraction structure. Similarly, the specification gives examples, such as at page 5, lines 12-16, of “optically effective structures 9 (Figure 1) such as microscopically fine diffractive gratings, microscopically fin, light-scattering relief structures or flat mirror surfaces” being shaped into the interface. It is well established that an applicant is entitled to be his or her own lexicographer. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection in view of the amendments and comments made herein.

Claim Rejections under 35 USC § 103

In the Office Action, Claims 1-10 and 12-19 have been rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,324,004 to Staub et al. (hereinafter referred to as “**Staub**”) in view of U.S. Patent No. 4,984,824 to Antes et al. (hereinafter referred to as “**Antes**”). The Office Action contends that Staub discloses substantially all the features of the rejected claims,

with the exception of the surface portion being of a dimension greater than 0.4mm. Applicant respectfully traverse this rejection.

Staub discloses a surface pattern 1 composed of a foreground area 2, that includes a pixel with microscopically fine relief structures diffracting visible light and a background area 4 that together with the foreground form a pattern. However, contrary to the assertion made in the subject Office Action, Staub fails to disclose a diffraction structure formed by additive or subtractive superimposition of a superimposition function (M) and a microscopically fine relief profile (R), where the superimposition function (M) is defined by a macroscopic structure.

In Staub, a diffractive grating (structure) is provided on both the foreground and background areas. This diffractive structure is produced by the superimposition of **at least two** relief structures F_1 and F_2 (see, Col. 2, lines 20-35; or Claim 1). Relief structure F_1 is disclosed as having a spatial frequency f_1 which is less than the spatial frequency f_2 of relief structure F_2 . Also, relief structure F_2 has a relative phase shift of $\Delta\Phi$ in relation to relief structures F_1 (see, Col. 2, lines 40-43; or Claim 1). Further, the ratio f_2/f_1 is selected from the range 1.5-3 (see, Col. 2, lines 60-66 and Claim 1). Also, the two relief structures F_1 and F_2 are described in an example as being sinusoidal functions (see, Col. 3, lines 9-10). Thus, the diffractive structure disclosed by Staub, is the result of the addition of the relief structures F_1 and F_2 (which results in an asymmetric relief profile). Such a diffractive structure is significantly different from the optically effective structures of the subject invention, which combines a macroscopic structure and a diffractive structure.

In Staub, the two functions F_1 and F_2 are added to form the gratings B_B and B_H . Thus, B_B and B_H are dependent on F_1 and F_2 (and their relative phase). It should also be noted that the combination gratings B_B and B_H are diffraction gratings (see, Col. 3, lines 12-18, and Claim 1). It follows from Claim 1 of Staub that if B_B and B_H are diffraction gratings, then both F_1 and F_2 are necessarily diffraction gratings. In particular, Claim 1 of Staub recites that “the spatial frequency of the diffraction grating B_B and that of the diffraction grating B_H are equal to the

lower of the two spatial frequencies f_1 and f_2 . See also, Staub Abstract: “superimposition of at least two different microscopically fine relief structures F_1 and F_2 diffracting visual light. Thus, if $f_1 < f_2$, then B_B and B_H have the spatial frequency f_1 . Since B_B is a diffraction grating, then F_1 is a diffraction grating. With $f_2 > f_1$, F_2 has a higher spatial frequency than F_1 and has period small than F_1 . This implies that it is also either a diffraction grating or a zero order grating. In any case, both F_1 and F_2 have small periods, meaning both B_B and B_H have small periods. Accordingly, the combination gratings B_B and B_H , as well as the basis gratings F_1 and F_2 , are diffraction gratings. In contrast, an aspect of the subject invention, as recited in Claim 1, includes that while relief profile (R) can be a diffraction grating, superimposition function (M) is a macroscopic structure and thus not a diffraction grating.

From the Fourier Series theorem, it is known that a periodic function, such as superimposition function M, can be composed through the superposition of a basis function F and its harmonics. In contrast, the addition of a basis function F_1 and its harmonic F_2 , as taught by Staub, will not form the function M. Thus, for example function M as shown in Fig. 8a, 11 or 13 of the subject application could never be achieved by Staub. Through the addition of F_1 and F_2 there are actually very few functions that can be formed. In fact, the discontinuities of the function M, as shown in Figs. 8a, 11 or 13, require a very large number of harmonics to realize and cannot be achieved by the addition of F_1 and F_2 .

Thus, Staub neither discloses the superimposition of a macrostructure and a diffractive structure nor a superimposition in that the relief profile, as shown in Fig. 6a, follows the superimposition function (M). In fact, Staub teaches one of ordinary skill in the art away from the claimed invention, since the superimposition of two diffractive structures is required. The relief structures resulting from the superimposition aspect of the present invention is clearly distinguished from the disclosure of Staub. Accordingly, Staub fails to disclose or reasonably suggest all the elements recited in the Claims as proposed by the subject Office Action.

Further, in the Office Action **Antes** was cited for teaching a document with a surface portion having a dimension greater than 0.4mm. However, Antes does not actually include such a teaching. In fact, Antes teaches away from such structure. Antes, at Col. 2, lines 26-27, indicates that “some of the surface portions have a maximum dimension of less than 0.3mm,” which clearly discloses an upper limit to such dimensions. The Office Action opines that Antes teaches using multiples of increments of 0.1mm for surface portions. However, the reference in Antes at Col. 4, lines 1-10 has been taken out of context. In reading Antes Col. 3, line 66 to Col. 4, line 14, it should be noted that such dimensions are taught in the context that elements sized less than 0.3mm are not distinguishable to the naked human eye (see also Claim 1 of Antes). Thus, Antes in the first full paragraph of Col. 4 discloses that dimensions below a 0.3mm threshold should be used in order conceal security features, because they are not visible to the naked human eye at such dimensions. Accordingly, Antes teaches away from including a surface portion having a dimension greater than 0.4mm comprising a diffraction structure.

Thus, the combination of Staub and Antes do not disclose all the limitations of the claimed invention, particularly Claim 1. Also, it would not have been obvious to one of ordinary skill in the art at the time of the subject invention to alter and/or combine Staub and Antes in order to arrive at the claimed invention. Applicants further submit that the Claims 2-19, which ultimately depend from Claim 1 are similarly patentable over the art of record by virtue of their dependence. Also, Applicants submit that claims 2-19 define patentable subject matter in their own right.

In view of the foregoing remarks, Applicants respectfully request reconsideration and allowance of the claims presented. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claims 1-10 and 12-19 under 35 U.S.C. § 103(a).

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Conclusion

Entry of the amendments herein and favorable consideration of Claims 1-19 are hereby solicited. In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner has any questions or suggestions to expedite allowance of this application, the Examiner is cordially invited to contact Applicant's attorney at the telephone number provided.

Respectfully submitted,

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